Testimony
Before the Subcommittee on Labor, Health and Human Services, and Education; Committee on Appropriations
United States House of Representatives

Substance Abuse and Mental Health Research and Services

Statement of
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For Release on Delivery

Expected at 9:45 a.m.
Wednesday, April 27, 2005

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Mr. Chairman and Members of the Committee:

I am pleased to be here to present the President's fiscal year (FY) 2006 budget request for the National Institute on Drug Abuse (NIDA) of $1.010 billion. NIDA is one of the 27 Institutes and Centers that make up the National Institutes of Health, and we support a broad array of research to improve the treatment and prevention of drug abuse and addiction as well as the medical consequences of drug abuse. NIDA's comprehensive research portfolio focuses on all drugs of abuse, both illegal and legal, including nicotine, but with the exception of studies where the primary focus is on alcohol. In addition, because drug abuse is a major vector for the spread of HIV/AIDS in this country, NIDA supports a robust AIDS research portfolio. Here I will discuss our remarkable scientific accomplishments as well as our strong collaborations with other NIH institutes and with the Substance Abuse and Mental Health Services Administration (SAMHSA).

I would like to thank you for your continued interest in the problems of substance abuse and mental illness, conditions that the World Health Organization has identified as the source of some of the greatest disease burden in our society. The tragedy of substance abuse and addiction is that they start early in life, can lead to a lifetime of both medical and behavioral consequences, and can change the trajectory of a young person's life, preventing them from achieving their full potential.

MEETING PUBLIC HEALTH NEEDS AND

TAKING ADVANTAGE OF SCIENTIFIC OPPORTUNITIES

In this age of unprecedented scientific opportunity, NIDA is committed to taking advantage of new opportunities, supporting strong science, and meeting the existing and emerging public health needs. I will highlight some of the significant scientific findings in our portfolio and discuss NIDA's plans to optimize the impact that science will have on the health of the public.

DRUG USE RATES: GOOD NEWS AND EMERGING PROBLEMS SUCH AS METHAMPHETAMINE

Again this year, we have some very good news from our Monitoring the Future Survey (MTF). We continue to see declines in overall illicit drug use, almost 7 % from 2003 to 2004, among 8th, 10th, and 12th graders combined, and about a 17% decline over the last three years. Despite this good news, MTF and other surveillance tools indicate that there are still important areas that need our increased attention. For the second year in a row, MTF reports inhalant abuse rising among 8th graders and the abuse of prescription painkillers continuing at alarming rates, especially among 12th graders, for whom these are among the most commonly abused drugs. Attitudes about steroid abuse, which are often linked to drug abuse behaviors, remain troublesome in that 44% of 12th graders do not consider steroids to be harmful substances, perhaps resulting from the mixed messages young people are receiving about these drugs from sports figures and the media. And finally, methamphetamine abuse appears to be growing in popularity in a number of locations around the country. In addition to its devastating effects on families and communities, methamphetamine abuse damages the brain, and is often

associated with risky sexual behaviors, which can increase the risk for transmission of HIV, hepatitis C, and other STDs. Indeed, the recent case of an HIV-infected methamphetamine abuser with a particularly virulent strain of HIV raises concerns over the potential deleterious effects of methamphetamine on the immune system and medication response.

LOOKING FOR A COMPETITIVE EDGE THROUGH DRUG USE

Whereas illicit drug use has been seen largely as an antisocial behavior, a means to achieve a rapid but fleeting euphoric state, or a misguided approach to coping with problems, we now appear to be entering an era where drugs are being abused to enhance performance and cognition, and increase the abuser's standing in society. This is not just the case for anabolic steroids, which have garnered a great deal of attention lately. There are reports that stimulants, including methylphenidate (Ritalin) and the amphetamines, are being abused by high school students to improve their scores on college entrance exams; by girls to achieve a body image that conforms to unrealistic standards created by the fashion and movie industry; by adults to cope with increasing responsibilities of living in a complex world that demands multitasking and high levels of productivity; and even by aging adults hoping to maintain their mental acuity. In an era where being bigger and better are considered more important than how you get there, medications are being used not just to cure ailments, but to improve perceived deficiencies, deter normal aging, and increase one's competitive edge. In addition to the ethical dilemmas posed by this form of drug abuse, there could be major health concerns that are largely ignored by those who choose a path of drug-induced performance

enhancement. Among these are addiction, infectious diseases, cardiovascular disease, strokes, and serious psychiatric and cognitive problems. NIDA will rise to this new challenge by supporting research to understand the changing patterns of drug abuse across the Nation in order to ensure that our messages and our research efforts target emerging health problems and attenuate their progression.

IMPROVING PREVENTION

Understanding Adolescent Brain Development

NIDA has made tremendous progress in understanding addiction as a chronic, relapsing disease, which affects both brain and behavior. We now know that addiction is a developmental disorder that begins in adolescence, and sometimes as early as childhood. A better understanding of adolescent decision making will ultimately lead to even more effective prevention efforts. For example, recent advances have provided us with more insight into why teens engage in risk-taking and thrill-seeking behaviors. These behaviors are likely due to the fact that the part of the brain responsible for judgment, decision-making, and control of emotional responses, the prefrontal cortex, is the last area of the brain to mature. We are now learning that adolescents are actually using different brain regions than adults do during their decision making processes. Further, it is becoming apparent that early exposure to drugs may have a significant impact on brain development and later behavior. From studies using animal models, researchers have shown that nicotine, for example, when given to young animals, can increase their response to drugs in adulthood, including their voluntary intake of nicotine. Further, our research indicates that adolescents, particularly girls, who smoke cigarettes, become

addicted far more quickly than adults who have had equivalent exposure to nicotine. NIDA is joining with a number of NIH Institutes to participate in the NIH Magnetic Resonance Imaging Study of Normal Brain Development, the goal of which is to determine the path of normal brain development and its relationship to cognitive and behavioral maturation. Using this state-of-the-art technology, NIDA will be able to investigate how drugs of abuse impact the developing brain. To develop more effective prevention messages, we need to understand both the cognitive and emotional processes that adolescents at various stages of maturity use to decide whether or not to smoke their first cigarette or use marijuana or other substances. Basic research on brain development is giving us powerful new insights into the decision making process.

Genes, Environment and their Interactions

Children of substance abusers have a higher risk for developing substance abuse and addiction at young ages. It is estimated that about 50% of the risk for addiction is genetically influenced--this represents not just the risk conveyed by genes themselves, but also the added impact of the environment on how those genes are expressed. NIDA will take full advantage of the remarkable opportunities afforded by the decoding of the human genome to identify genes that make individuals more vulnerable to developing addiction as well as those genes that may protect individuals from addiction. Knowing an individual's genetic vulnerability will ultimately enable us to individualize treatments for a patient's addiction. One intriguing example of this is the discovery by NIDA-supported researchers that a common variant of the mu-opioid receptor gene is associated with improved treatment response to naltrexone in alcoholics, as well as with

improved response to nicotine replacement treatment in smokers. This type of research, which hints at the future of medicine where treatments are tailored to each individual patient, has the potential to optimize treatment success, and reduce the costs to healthcare systems as well.

Information gained from genetic research will also help to identify individuals with a predisposition to addiction. It is important to bear in mind that predisposition is not predetermination. Environmental and other biological factors, including family, culture, and community, are of great importance to the development of addiction and are essential to its prevention.

Comorbidity is Reality

Mental illness also increases the risk for substance abuse and addiction. As many as 6 in 10 people who abuse drugs and alcohol also suffer from mental illnesses, according to epidemiological studies, and some 25 to 60 percent of individuals with mental illnesses also have substance abuse disorders. The overwhelming reality of these co-occurring disorders presents huge challenges for drug abuse research, prevention, and treatment.

In children, major factors for early drug abuse are conduct disorder, Attention Deficit Hyperactivity Disorder (ADHD), especially if left untreated, and learning disabilities. But research is informing us of the bi-directional nature of this relationship as well. That is, drug abuse can be either a consequence of, or a risk factor for, mental disorders. Often diagnosis of one or the other problem does not come until long after symptoms

first emerge, further complicating our ability to determine causality. Additionally, since both mental illness and substance abuse are influenced by genetic and environmental factors, there may be common causes that lead to their co-occurrence.

Thus, it is critical that we devote resources to develop interventions that are geared to children and adolescents who may be at high risk for co-morbidity. Educating pediatricians, child psychiatrists, and primary care physicians about this issue and working toward the development of a more integrated health care system to address the reality of co-occurring diseases are important first steps.

NIDA is preparing to launch a large clinical study in our Clinical Trials Network later this year to test whether treatment of ADHD will improve substance abuse outcomes in those who suffer from both conditions. We are also actively working with NIMH and NIAAA to support research that will increase our fundamental knowledge about substance abuse and mental health comorbidity, and to advance efforts to prevent this destructive combination. With our colleagues from SAMHSA, we are helping to move forward the action agenda developed from the President's New Freedom Commission on Mental Health. Also, by serving on the National Steering Council for the Co-Occurring Center for Excellence, NIDA provides advice and guidance on how best to develop, plan, communicate and disseminate information on the range of issues involved in co-occurring mental and substance abuse disorders.

DRUG ABUSE: THE MAJOR VECTOR FOR THE SPREAD OF AIDS

Drug abuse and HIV/AIDS are intertwined epidemics-- injection drug use (IDU) accounts for approximately 1/3 of all the AIDS cases in this country. That is only one part of the problem of HIV transmission, however. Non-IDU heroin and cocaine abusers also show much higher rates of HIV infection than the general population. Multiple factors contribute to these high rates, primarily involving risky sexual behaviors that many drug abusers engage in, due to changes in their mental state from drug intoxication. We are also discovering from basic research that certain drugs of abuse can compromise the immune system putting users at greater risk for contracting the illness or for having a more severe course.

Addiction treatment has been shown to be an effective way to prevent the spread of diseases, such as HIV/AIDS and hepatitis. Drug injectors who do not enter treatment, for example, are up to six times more likely to become infected with HIV than injectors who enter and remain in treatment. Participation in treatment also presents opportunities for screening, counseling, and referral for additional services, which can all help to reduce the spread of diseases to the general population.

NIDA research has shown that HIV screening can be a cost-effective way to prevent and treat diseases, such as HIV/AIDS. Two independent papers published this year have demonstrated that if you screen for HIV in health care settings, detect it, and start active antiretroviral therapy (HAART) early you can increase life expectancy and reduce transmission rates. For example, a person who is screened at 30 years of age would

increase life expectancy by almost two years. Further, if you screen a larger segment of the population, HIV transmission rates can be decreased by about 20%. Therefore, screening can not only save lives, but it can also save dollars.

The HIV/AIDS epidemic has taken a disproportionate toll on racial and ethnic minority populations. The CDC reports that during 2000–2003, HIV/AIDS rates for African American males were 7 times those for white males, and African American females were 19 times the rates for white females and exceeded the rates for males of all races/ethnicities other than African Americans. NIDA has launched an initiative that is specifically focusing on reducing HIV rates among African Americans, including conducting more studies in geographic areas where rates are highest and developing interventions that are ethnically appropriate. Further, because African American males are nearly 8 times more likely to be incarcerated than white males, supporting research on the intersection of drug use and criminal justice consequences in the African American population is a high priority for NIDA.

BRINGING TREATMENTS INTO THE CRIMINAL JUSTICE SYSTEM: REDUCING ADDICTION AND RECIDIVISM

The connection between drug abuse and crime for juveniles and adults is well known. One of the lessons learned from treatment research is that treatment can be successful even if it is not entered into voluntarily. In fact, many people in treatment were referred

through the criminal justice system, and the majority of them have some criminal justice status (on parole, probation, or awaiting trial). Successful outcomes have been achieved with criminal offenders who receive treatment in prisons, provided that an after-care component is also included during their transition back into the community. For example, comprehensive treatment of drug-addicted offenders, when coupled with treatment after release from prison, results in 40-50% of offenders being drug-free one year later, compared with only 15% of those who are untreated. Further, only about 20% of offenders who completed treatment were rearrested during the first year after prison, compared to nearly 60% of untreated offenders. These benefits persist for at least 4 years after release.

An outstanding example of cooperation between the research community and federal agencies (NIAAA, SAMHSA, CDC, and several agencies within the Department of Justice) that will improve the public health and safety of our citizens is the establishment of the Criminal Justice Drug Abuse Treatment Research Studies (CJ-DATS). CJ-DATS is a multi-site research initiative designed to improve outcomes for offenders with substance abuse and addiction by improving the integration of drug abuse treatment with other public health and public safety systems. Under NIDA's leadership, nine research centers and a Coordinating Center were created in partnership with researchers, criminal justice professionals, and drug abuse treatment practitioners to develop more successful strategies to assist drug abusing criminal offenders. Given that there are over 6.6 million adults on probation, in jail or prison, or on parole, and a large percentage of them are in need of drug abuse treatment, it behooves us to use

research to address this public health and public safety issue. We know that left untreated, offenders often relapse to drug use and return to criminal behavior.

TRANSLATING RESEARCH TO IMPROVE HEALTH OF THE NATION

NIDA has and continues to focus much effort on finding new treatments for substance abuse. We have recently announced two new funding opportunities targeting methamphetamine addiction and its related medical consequences, one to encourage studies on drug-resistant HIV in methamphetamine abusers, and the second focusing on behavioral and integrative therapies for methamphetamine abuse and addiction. Currently a cognitive behavioral intervention, which was specifically adapted to treat methamphetamine abuse (MATRIX) is our most effective intervention, though we are also making progress in developing other behavioral and pharmacological therapies. NIDA's medications program is bringing us closer to having new treatments for both cocaine and methamphetamine addiction. It has identified several promising compounds in animal studies and has shown initial efficacy in clinical studies of several marketed medications, such as disulfiram, which is prescribed for alcoholism; modafinal used to treat narcolepsy; and gamma-vinyl GABA (not marketed in the US) and topiramate, both used to treat seizure disorders. Progress is also being made to develop vaccines for cocaine and nicotine addiction.

There is also a promising candidate for treating marijuana addiction, Rimonabant. Basic research has shown that Rimonabant blocks the function of a specific group of proteins in the brain known as cannabinoid receptors. These receptors are involved in the

regulation of pain, appetite, motor function, memory, and are the sites in the brain where marijuana exerts its many effects. Rimonabant is currently being developed by the pharmaceutical industry as a medication to help people lose weight and stop smoking, and through NIDA's efforts is showing promise for treating marijuana addiction as well as preventing relapse to other drugs.

BRIDGING THE DISCONNECT: BLENDING RESEARCH AND PRACTICE

An overriding problem is that despite the availability of proven effective behavioral and pharmacological treatments for addiction, most people who need treatment do not receive it. This is one of the challenges of health services research -- to determine how best to diffuse treatments into communities, to make them cost-effective, acceptable and used by providers and patients.

A report by the Institute of Medicine in 1998 stated that it takes 17 years on average for research results to affect treatment delivery. Thus, NIDA has made it a priority to substantially shorten this wide gap in bringing science to practice. The National Drug Abuse Treatment Clinical Trials Network (CTN) was created with this in mind to provide the infrastructure to test research-based treatments in real world settings. The 17 CTN research nodes and more than 120 community treatment settings currently serve 27 States plus the District of Columbia and Puerto Rico. It was developed during the period of the doubling of the NIH budget, in order to test the effectiveness of new and improved interventions in community based treatment settings with diverse populations.

Six different treatment protocols have been completed in our national clinical trials infrastructure. In addition to testing and providing research-based treatments to the more than 4700 patients who have been or are currently enrolled in clinical protocols, by involving community treatment providers in clinical research, NIDA researchers are also training these providers in the delivery of such treatments and in so doing are beginning to infuse evidence-based practices into the diverse culture of community treatment. This, in turn, is leading to long-needed changes in the way treatment is provided in this country.

In addition, a major paradigm shift in the way opiate addiction medication is delivered in the United States occurred when Congress passed the Drug Addiction Treatment Act of 2000 (DATA) allowing physicians to prescribe narcotic medications (Schedules III to V) for use in opiate addiction treatment. NIDA collaborated with industry to develop the medications buprenorphine and buprenorphine/naloxone for the treatment of opiate addiction and to achieve FDA approval in October 2002. These medications became the first to be eligible for dispensing under the DATA. SAMHSA has played a pivotal role, by providing the training that allows physicians across the country to prescribe these medications. Last year, a medication detoxification protocol using buprenorphine/naloxone for heroin/opiate addiction was shown in CTN sites to be effective and acceptable to both patients and providers, and is now being adopted in traditional “medication or drug-free” clinics.

To further our efforts to bring science-based interventions into community practice, beginning in 2002 NIDA has spent $1.5 million per year to help support SAMHSA/CSAT's (Center for Substance Abuse Treatment) Addiction Technology Transfer Center (ATTC) Program. The ATTC is a nationwide, multidisciplinary resource designed to increase the knowledge and skills of addiction treatment practitioners by facilitating state-of-the-art research education and training.

Our work with SAMHSA/CSAT through the ATTCs has developed into what we call the "Blending Initiative," which was designed to streamline the incorporation of research-based treatment findings into community settings. We are proud of the fact that through this collaboration we were able to develop two research dissemination products that treatment providers and managers can use to improve the quality of treatment in their communities. There are three other products derived from CTN research findings currently being developed by the NIDA and SAMHSA blending teams.

NIDA is also working with CSAT to stimulate and support innovative research to determine the components necessary for adopting, adapting, delivering, and maintaining effective evidence-based programs, and practices in State-sponsored treatment programs. And, in collaboration with SAMHSA's Center for Substance Abuse Prevention (CSAP), NIDA will assist in developing State epidemiology monitoring systems to inform prevention decision-making and programming in States with new CSAP State Incentive Grants.

ACCELERATING NEUROSCIENCE RESEARCH THROUGH NIH NEUROSCIENCE BLUE PRINT AND ROAD MAP ACTIVITIES

Recognizing that neuroscience research is the foundation for all of our drug abuse prevention and treatment efforts, NIDA will continue to pursue innovative and cost-effective ways to support this critical research. For example, NIDA is an active participant in the new NIH Neuroscience Blueprint activities. The Blueprint provides a forum for the 15 NIH Institutes and Centers that support research on the nervous system to pool resources and expertise. In addition to taking the lead in inventorying all the neuroscience tools funded by NIH and government agencies this year, in FY 2006 NIDA will take the lead in developing crosscutting training mechanisms for important areas such as neuroimaging and computational biology. NIDA researchers are also benefiting from their participation in NIH Roadmap activities, especially the Molecular Libraries and Imaging efforts.

CONCLUSION

NIDA's research portfolio is comprehensive and strategically poised to take advantage of new opportunities as they arise. We continue to make great strides to translate and disseminate research-based products so they can be used in the real world, providing the Nation with the tools necessary to reduce drug use in this country. Sustaining the momentum of our efforts will lead to even more discoveries that will improve health and quality of life for all Americans.

Thank you for this opportunity and I will be pleased to answer any questions you may have.

Nora D. Volkow, M.D.

Director
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Nora D. Volkow, M.D. is the Director of the National Institute on Drug Abuse (NIDA). Before assuming this position on May 1, 2003, Dr. Volkow was Associate Director for Life Sciences at Brookhaven National Laboratory (BNL), Director of Nuclear Medicine at BNL and Director of the NIDA-Department of Energy Regional Neuroimaging Center at BNL. She was also Professor at the Department of Psychiatry, State University of New York (SUNY) at Stony Brook and Associate Dean for the Medical School at SUNY-Stony Brook. Dr. Volkow received her M.D. in 1981 from the National University of Mexico, in Mexico City, Mexico, and performed her residency in psychiatry at New York University.

Her main area of interest is the investigation of the mechanisms underlying the reinforcing, addictive, and toxic properties of drugs of abuse in the human brain. Dr Volkow was the first to use imaging to investigate the neurochemical changes in the human brain that occur during drug addiction. Her studies have documented a decrease in function of the dopamine system in addicted subjects that is associated with a disruption in function of frontal brain regions involved in motivation and drive. Her work has also focused on the investigation of the neurochemical mechanisms responsible for intersubject variability in response to drugs of abuse and its potential link to vulnerability to drug abuse and alcoholism.

Dr. Volkow has also used imaging to investigate the effects of stimulant drugs with respect to both their rewarding as well as therapeutic actions. By doing a systematic comparison of the pharmacological effects of cocaine (one of the most addictive drug of abuse) and of methylphenidate (a drug used to treat children with attention deficit hyperactivity disorder) in the human brain, her studies have highlighted the relevance that drug pharmacokinetics play in enabling the reinforcing effects of stimulant drugs to occur. These studies have also shown that stimulant drugs, when used therapeutically, amplify DA signals in the brain, enhancing the saliency of a stimulus and thus improving attention and performance.

She has also used imaging to investigate the changes in the dopamine system that occur with aging and their functional significance. Her work has documented that the loss of dopamine brain function with age in healthy subjects with no evidence of neurological dysfunction is nonetheless associated with motor slowing and with changes in performance of cognitive tasks that involve executive functions. Her work now focuses on strategies to minimize the age-related losses in dopamine brain activity as a means to improve quality of life in the elderly.

Dr. Volkow has authored or coauthored more than 300 peer-reviewed publications, three edited books, and more than 50 book chapters and non-peer reviewed manuscripts. She is the recipient of multiple awards for her research, and has been elected to membership in the Institute of Medicine in the National Academy of Sciences. Dr. Volkow was named "Innovator of the Year" in 2000 by *US News and World Report.*

Department of Health and Human Services
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William R. Beldon

Mr. Beldon is currently serving as Deputy Assistant Secretary, Budget in the Department of Health and Human Services. He has been a Division Director in the Budget Office for sixteen years, most recently as Director of the Division of Discretionary Programs. Mr. Beldon started in federal service as an auditor in the Health, Education and Welfare Financial Management Intern program. Over the course of more than 30 years in the Budget Office, Mr. Beldon has held Program Analyst, Branch Chief and Division Director positions. Mr. Beldon received a Bachelor's Degree in History and Political Science from Marshall University and attended the University of Pittsburgh where he studied Public Administration. He resides in Fort Washington, Maryland.